

Work Order ID 84666

May-30-12 3:46:45 PM

Duplicate

84666

Page 1

Item ID: D350-748-241TRN

Accept

N9000040100

Setup Start *NS1*

Revision ID:

Stop *NS2*

Item Name: Crosstube Turning Detail

Start Date: 17/05/2012 Start Qty: 1.00

1

Cust Item ID:

Required Date: 22/05/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan:

MLJ

Date:

12/05/31

Tooling:

Date:

Run Start *NR1*

QC:

Date:

SPC (Y/N):

Date:

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Draw Nbr

Revision Nbr

D350-748-241

F

100

0.00

100

MORI SEIKI CNC LATHE LARGE

Mori Seiki

Memo

0.00

Mori Seiki CNC Lathe Large

1-Fill tube with sand & install plugs on both ends as per Folio FA647
2-Turn first side as per Folio FA647
3- File transition lines smooth.
FOLIO REV: *E*
DWG REV: *E*

1 Ø KC 12-6-10

110

QC1- Inspect dimensions to dimension sheet

0.00

110

QC

Memo

0.00

Quality Control

1 Ø KC 12-6-10

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

W/O:		WORK ORDER CHANGES					
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NOTE: Date & initial all entries

84666

May-30-12 3:46:45 PM

Accept

N900040100

Setup Start *NS1*

Stop *NS2*

Cust Item ID:

Start Date: 17/05/2012 **Start Qty:** 1.00

*** 1 ***

Customer:

Required Date: 22/05/2012 **Req'd Qty:** 1.00

*** 1 ***

Reference:

Run Start *NR1*

Approvals: Process Plan: Date: Tooling: Date:

Stop ***NR2***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Date: _____ **SPC (Y/N):** _____ **Date:** _____

Operation Description

Set Up/ Run Hours

Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
---------	--------	-----------	------------	------------	---------------	-------------

150

0.00

150

Large Fab

0.00

Crosstubes

Memo

1-DRILL HOLES FOR HEAT TREAT USING DT9806(HOLES MUST BE
ALIGNED ON SAME LINE ON BOTH CUFFS)

Crosstubes

2-Grind machining marks

160

Outsource process - Heat Treat

0.00

160

0.00

Outsource1

Memo

Issue P/O: 17355
Heat Treat to min 180 KSI As per Dwg D350-748-241
Sand Blast tube after Heat Treat
Possible Supplier: Vac Aero
Ensure Certificate of Conformity is attached

Outsource process - Heat Treat

170

Receive & Inspect for Damage & Mat'l Certs

0.00

170

0.00

Packaging

Memo

Ensure certificate of conformaty is attached

Packaging

W/O:		WORK ORDER CHANGES					
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Work Order ID 84666

84666

Page 4

May-30-12 3:46:45 PM

Item ID: D350-748-241TRN

Accept

N900040100

Setup Start *NS1*

Revision ID:

Stop *NS2*

Item Name: Crosstube Turning Detail

Start Date: 17/05/2012 Start Qty: 1.00

1

Cust Item ID:

Required Date: 22/05/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start *NR1*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180	QC6- Inspect dimensions to drawing	0.00							
180									
QC	Memo	0.00							
Quality Control									
190		0.00							
190	Packaging								
Packaging	Memo	0.00							
Packaging	Identify and stock in kanban rack								
	Location: 16 B 84555 87225								
200	QC21- Final Inspection - Work Order Release	0.00							
200									
QC	Memo	0.00							
Quality Control									

5/2/9/13

PTO →

rw

12-9-13

13/5/22

W 12-09-14

W/O: 841610		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

See print 13-2649

Part No: D350-748-241TRN PAR #: _____ Fault Category: X-tubes NCR: Yes No DQA: Adm Date: 13/05/25
 Resolution: _____ Disposition: Rework QA: N/C Closed: ✓ Date: 13/5/23

NCR: 13-2652		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
<u>12/08/28</u>	<u>100</u>	<u>tubes are not straight</u> <u>and are not sandblasted</u> <u>P.C. supplies</u>	<u>DAS 16</u> <u>Q57042</u> <u>12/08/28</u>	<u>Build all Heat treating</u> <u>SCALE - Before Bending</u>	<u>JW</u> <u>12-8-28</u>	<u>ZM</u> <u>12-8-28</u>	<u>DAS 16</u> <u>Q57042</u> <u>12/08/28</u>	<u>DAS 16</u> <u>Q57042</u> <u>12/08/28</u>

NOTE: Date & initial all entries

Picklist Print

May-30-12 3:46:49 PM

Page 1

Work Order ID: 84666

84666

Parent Item: D350-748-241TRN

D350-748-241TRN

Parent Item Name: Crosstube Turning Detail

Start Date: 17/05/2012

Required Date: 22/05/2012

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:A New Issue 08-03-06 DD verified by:ec
 IPP Rev B Removed polish 08.04.02 EC verified by : DD
 IPP Rev C Removed LPS-3 08.06.23 Ec verified by: DD IPP Rev D
 11.02.24 as per dwg rev.F DD verf: JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6015-125		Manufactured	No			120	Each	38.0000	1	1			

D6015-125

Crosstube Material

**

Location

Loc Qty

Loc Code

HALL

38

61380

4

72511

34

1 919ml 12/06/07

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order: 84666
Description: Crosstube Assembly (AS350/355 High Aft)		Part Number: D350-748-241
Inspection Dwg: D350-748-241 Rev: F		Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.240	+0.005/-0.000	2.245	/	VERN	CNC-08
	2.180	+0.005/-0.000	2.184	/		
	2.180	+0.005/-0.000	2.184	/		
	2.208	+0.005/-0.000	2.213	/		
	2.234	+0.005/-0.000	2.239	/		
	2.253	+0.005/-0.000	2.258	/		
	2.272	+0.005/-0.000	2.277	/		
	2.299	+0.005/-0.000	2.304	/		
	0.063	+/-0.010	.063	/	RG	
	4.26	+/-0.030	4.26	/	VERN	CNC-08
	R0.063	+/-0.010	.063	/	RG	
	R0.50	+/-0.030	.500	/	RG	
	2.240	+0.005/-0.000	2.245	/	VERN	CNC-08
	2.180	+0.005/-0.000	2.184	/		
SIDE B	2.180	+0.005/-0.000	2.184	/		
	2.208	+0.005/-0.000	2.213	/		
	2.234	+0.005/-0.000	2.239	/		
	2.253	+0.005/-0.000	2.258	/		
	2.272	+0.005/-0.000	2.277	/		
	2.299	+0.005/-0.000	2.304	/		
	0.063	+/-0.010	.063	/	RG	
	4.26	+/-0.030	4.263/8	/	VERN	CNC-08
	R0.063	+/-0.010	.063	/	RG	
	R0.50	+/-0.030	.50	/	RG	
	122.70	+/-0.060	122.70	/	tape	LG-15

OK
GP
12/6/11

Measured by: JRM/VC	Audited by: DP	Preliminary Approval:
Date: 12/06/08	Date: 12-6-11	Date:

Rev	Date	Change	Revised by	Approved
A	07.01.17	New Issue (P/O D350-748-201)	KJ/JLM	
B	12.02.02	Dwg Rev updated	KJ	

W/O:		WORK ORDER CHANGES					
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries,

Item	Qty -241	Part Number	Description
1	X	D350-748-241	CROSSTUBE ASSEMBLY (AS 350/355 HI AFT)
2	1	D6015-125	CROSSTUBE (OR D6018-125)
3	2	D3502-1	SUPPORT
4	2	D2856-400-710	ABRASION STRIP
5	1	AELS-1032-225	INSERT
6	1	NAS1149D0363J	WASHER (OR AN960JD10)
7	2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
8	1	MS27039-1-10	SCREW

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6015-125 OR D6018-125
FINISHED LENGTH = 122.700±0.06
- 2) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: DART PART NUMBER "D350-748-241" AND BATCH NUMBER ON INSIDE OF CUFF
PER DART QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 29.85 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- 9) RUN CUTTER OFF PART WHERE INDICATED. BLEND OUT ALL EDGES FROM MACHINING
LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER
BENDING.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO
BENDING IS 6% BASED ON O.D.
- 11) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING. ACCEPTABLE TO
VERIFY TENSILE STRENGTH BY HARDNESS TEST PER ASTM E18 TO 40-45 HRC.
- 12) INST ALL D2856-400-710 ABRASION STRIPS WITH A GAP ON BOTTOM SIDE OF CROSSTUBE,
CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 13) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE
OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES,
NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY.
CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE
MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO
CRACKING/CHIPPING/GROOVES.
- 14) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT
NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.
- 15) MAX TWIST AFTER BENDING: WITH XTUBE LAYED FLAT ON SURFACE, THE DIFFERENCE BETWEEN
CUFF HEIGHTS FROM THE SURFACE MAY BE NO LARGER THAN 0.25 (ZN C1-3).

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 84666 MLJ
12/05/31

RELEASED
2011-07-08

F	ADD HRC TEST OPTION (B8-1) PER PAR 09-040, ADD TWIST LIMIT (A8-1, C1-3), ADD D6015-125 OPTION (C8-1), STOCK DIM NOW MACHINED (D1-4)	CP	10.11.23
E	REVISE GENERAL NOTES; UPDATE TO CURRENT STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A8-3); ADD TOLERANCES (ZN C6-3, D2-3)	RF	09.09.30
D	MAG. PARTICLE AND CAD PLATE AS MFD.	CP	06.10.31
C	ADD CAD PLATING	CP	06.08.14
B	ADD D6018-125 & PRIME AND PAINT	CP	06.06.30
A	NEW ISSUE	CP	06.03.31
REV.	DESCRIPTION	BY	DATE
DESIGN	<u>JP</u>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	<u>JP</u>	DRAWING NO. REV. F D350-748-241 SHEET 1 OF 4	
CHECKED	<u>JP</u>	TITLE SCALE CROSSTUBE (AS 350/355 HI AFT) NTS	
MFG. APPR.	<u>JP</u>	COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT THE WRITTEN PERMISSION FROM DART AEROSPACE LTD.	
APPROVED	<u>JP</u>	DATE 10.11.23	
DE APPR.	<u>JP</u>		

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

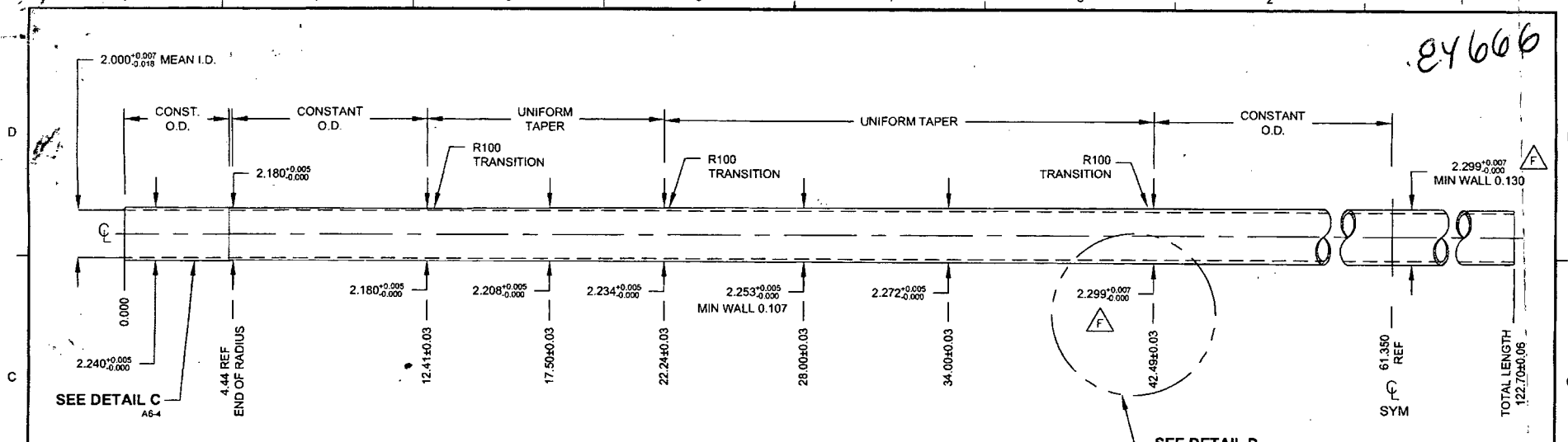
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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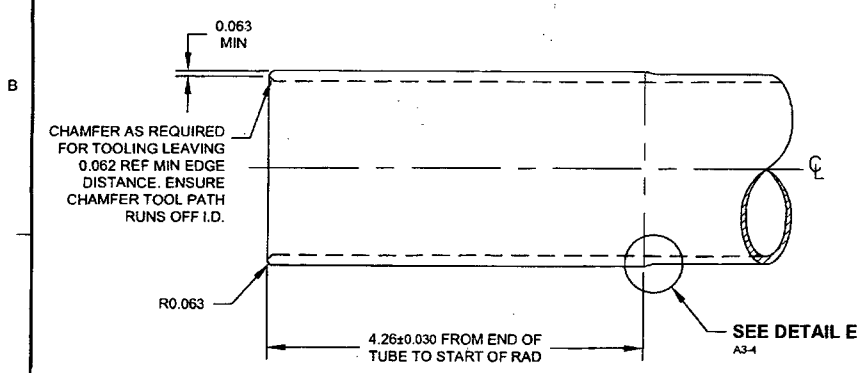
NOTE: Date & initial all entries

84606

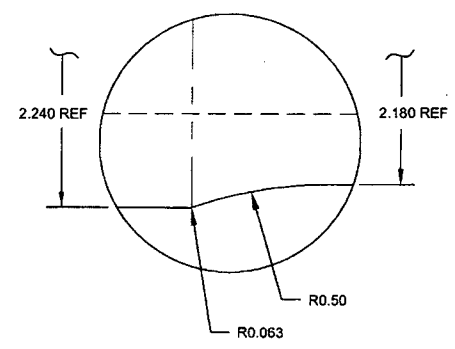


**D350-748-241TRN
TURNING DETAIL**

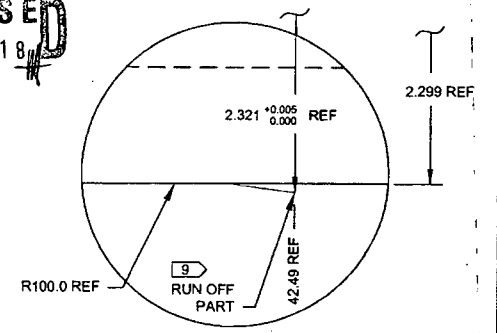
RELEASED
2011-01-18



**DETAIL C:
CROSSTUBE CUFF** C8-4
SCALE 3X



**DETAIL E:
CUFF TRANSITION** A5-4
NOT TO SCALE



**DETAIL D:
TAPER RUN-OFF** C3-4
NOT TO SCALE

DESIGN	90	DART AEROSPACE LTD	
DRAWN	90	HAWKESBURY, ONTARIO, CANADA	
CHECKED	90	DRAWING NO.	REV. F
MFG. APPR.	90	D350-748-241	SHEET 4 OF 4
APPROVED	90	TITLE	SCALE
DE APPR.	90	CROSSTUBE (AS 350/355 HI AFT)	NTS
DATE	10.11.23	<small>COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	

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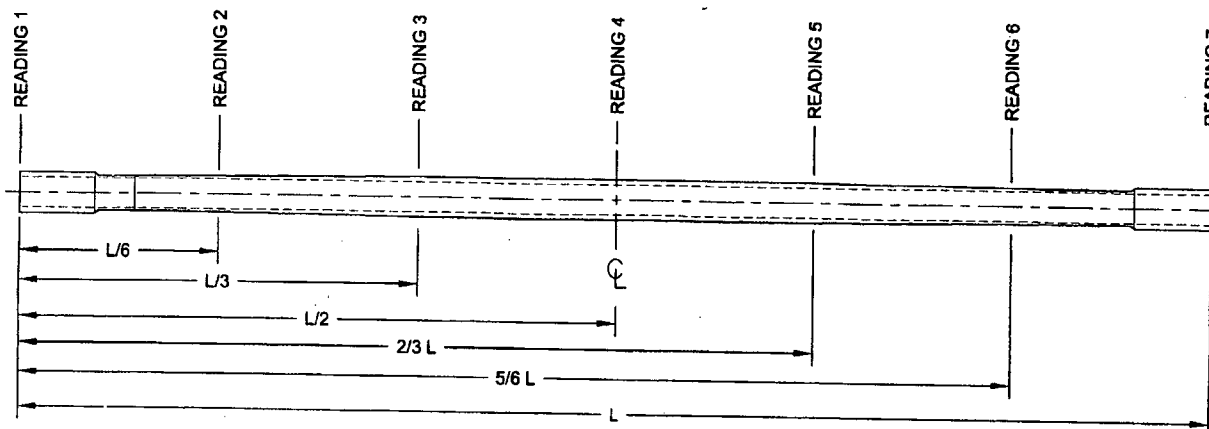
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DART AEROSPACE LTD		Work Order:	84666
Description: Crosstube Assembly (AS350/355 High Aft)		Part Number:	D350-748-241
Inspection Dwg: D350-748-241 Rev: F		Page 2 of 2	

WALL THICKNESS MEASUREMENT



Location	WALL THICKNESS MEASUREMENT (IN)				Deviation Δw (max-min)	TOLERANCE
	w1	w2	w3	w4		
READING 1 L = 0"	.132	.138	.126	.123	.015	0.030"
READING 2 L = 14"	.096	.114	.109	.094	.02	
READING 3 L = 28"	.135	.138	.135	.132	.006	
READING 4 L = 61"	.159	.161	.156	.158	.005	
READING 5 L = 28"	.133	.137	.132	.132	.005	
READING 6 L = 14"	.096	.102	.111	.099	.015	
READING 7 L = cuff	.125	.129	.131	.128	.006	

Calibration Result

Actual Block Thickness: _____



SITESCAN 250 Measured Thickness: _____

Measured by:	man, l
Date:	12/07/11

Audited by:	DP
Date:	12-6-11

Preliminary Approval:	
Date:	

Rev	Date	Change	Revised by	Approved
A	07.01.17	New Issue (P/O D350-748-201)	KJ/JLM	
B	12.02.02	Dwg Rev updated	KJ	
C	12.06.04	Wall thickness form added	KJ	

W/O:		WORK ORDER CHANGES					
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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

METLAB
1000 E. MERMAID LANE
WYNDMOOR, PA 19038

Packing I

Sales Order No.

Sales Order

Aug 1.

Voice: 215-233-2600
Fax: 215-233-5653

Sold To:
DART AEROSPACE
1270 ABERDEEN STREET
HAWKESBURY, ON K6A 1K7

Ship To:
DART AEROSPACE
1270 ABERDEEN STREET
HAWKESBURY, ON K6A 1K7

Customer ID	PO Number	Payment Terms
DARA	PO17555	Net 30 Days
Ship Via	Process	
R & L CARRIER	HT	

Quantity	Item	Description	Total Shipped	This Ship
1.00	EACH	D350-748-241TRN HEAT TREAT TO MIN 180 KSI (MIL-T-6736 OR AMS 2759-IC) SANDBLAST AFTER HT		
1.00	EACH	D350-748-241TRN HEAT TREAT TO MIN 180 KSI (MIL-T-6736 OR AMS 2759-IC) SANDBLAST AFTER HT		
1.00	EACH	D350-748-241TRN HEAT TREAT TO MIN 180 KSI (MIL-T-6736 OR AMS 2759-IC) SANDBLAST AFTER HT		
1.00	EACH	D350-748-241TRN HEAT TREAT TO MIN 180 KSI (MIL-T-6736 OR AMS 2759-IC) SANDBLAST AFTER HT		
1.00	EACH	D350-748-241TRN HEAT TREAT TO MIN 180 KSI (MIL-T-6736 OR AMS 2759-IC) SANDBLAST AFTER HT		

COMMENTS

SHIPPED BY, SIGNATURE
METLAB

DATE

RECEIVED BY, SIGNATURE
DART AEROSPACE

DATE

METLAB
1000 E. MERMAID LANE
WYNDMOOR, PA 19038

Packing I

Sales Order, Nu

7

Sales Order

Aug 1,

Voice: 215-233-2600

Fax: 215-233-5653

Sold To:

DART AEROSPACE
 1270 ABERDEEN STREET
 HAWKESBURY, ON K6A 1K7

Ship To:

DART AEROSPACE
 1270 ABERDEEN STREET
 HAWKESBURY, ON K6A 1K7

Customer ID	PO Number	Payment Terms
DARA	PO17555	Net 30 Days
	Ship Via	Process
	R & L CARRIER	

Quantity	Item	Description	Total Shipped	This Shipm
1.00	EACH	D350-748-241TRN HEAT TREAT TO MIN 180 KSI (MIL-T-6736 OR AMS 2759-IC) SANDBLAST AFTER HT		
1.00	EACH	D350-748-241TRN HEAT TREAT TO MIN 180 KSI (MIL-T-6736 OR AMS 2759-IC) SANDBLAST AFTER HT		
1.00	EACH	D350-748-241TRN HEAT TREAT TO MIN 180 KSI (MIL-T-6736 OR AMS 2759-IC) SANDBLAST AFTER HT		
1.00	EACH	D350-748-241TRN HEAT TREAT TO MIN 180 KSI (MIL-T-6736 OR AMS 2759-IC) SANDBLAST AFTER HT		
1.00	EACH	D350-748-241TRN HEAT TREAT TO MIN 180 KSI (MIL-T-6736 OR AMS 2759-IC) SANDBLAST AFTER HT		

COMMENTS

SHIPPED BY, SIGNATURE
 METLAB

DATE

RECEIVED BY, SIGNATURE
 DART AEROSPACE

DATE

Packing I

Aug 1,

Sold To:
DART AEROSPACE
1270 ABERDEEN STREET
HAWKESBURY, ON K6A 1K7

Ship To:
DART AEROSPACE
1270 ABERDEEN STREET
HAWKESBURY, ON K6A 1K7

Customer ID	PO Number	Payment Terms
DARA	PO17555	Net 30 Days
	Ship Via	Process
	R & L CARRIER	

Quantity	Item	Description	Total Shipped	This Ship
		250 POUNDS TOTAL		

SHIPPED BY, SIGNATURE
METLAB

DATE _____

RECEIVED BY, SIGNATURE
DART AEROSPACE

DATE _____



1000 E. Mermaid La., Wyndmoor (Phila.) PA 19038-8093
Tel. (215) 233-2600 Fax (215) 233-5653

Invoice

Invoice Num

0114

Invoice D

Aug 16, 2012

Sold To:

DART AEROSPACE
1270 ABERDEEN STREET
HAWKESBURY, ON K6A 1K7

Ship To:

DART AEROSPACE
1270 ABERDEEN STREET
HAWKESBURY, ON K6A 1K7

Customer ID		Customer PO	Payment Terms	
DARA		PO17555	Net 30 Days	
Shop Order No.		Shipping Method	Ship Date	Due Date
73276		R & L CARRIER	8/16/12	9/15/12
Quantity	Item	Description	Unit Price	Extended Price
1	EACH	D350-748-241TRN HEAT TREAT TO MIN 180 KSI (MIL-T-6736 OR AMS 2759-IC) SANDBLAST AFTER HT	205.000	205.000
1	EACH	D350-748-241TRN HEAT TREAT TO MIN 180 KSI (MIL-T-6736 OR AMS 2759-IC) SANDBLAST AFTER HT	205.000	205.000
1	EACH	D350-748-241TRN HEAT TREAT TO MIN 180 KSI (MIL-T-6736 OR AMS 2759-IC) SANDBLAST AFTER HT	205.000	205.000
1	EACH	D350-748-241TRN HEAT TREAT TO MIN 180 KSI (MIL-T-6736 OR AMS 2759-IC) SANDBLAST AFTER HT	205.000	205.000
1	EACH	D350-748-241TRN HEAT TREAT TO MIN 180 KSI (MIL-T-6736 OR AMS 2759-IC) SANDBLAST AFTER HT	205.000	205.000
1	EACH	D350-748-241TRN HEAT TREAT TO MIN 180 KSI (MIL-T-6736 OR AMS 2759-IC) SANDBLAST AFTER HT	205.000	205.000

ANY DISCREPANCIES MUST BE REPORTED WITHIN 10 DAYS AFTER RECEIPT.

We accept AMEX, Visa & Master Card



Heat Treating and Metallurgical Consulting

Subtotal	Conti
Shipping/Handling	
Total Invoice Amount	Conti
Payment Received	
TOTAL	Conti

Visit our Web Site: <www.thomasregister.com/metlab/>



1000 E. Mermaid La., Wyndmoor (Phila.) PA 19038-8093
Tel. (215) 233-2600 Fax (215) 233-5653

Invoice

Invoice Num

0114

Invoice C

Aug 16, 2

Sold To:

DART AEROSPACE
1270 ABERDEEN STREET
HAWKESBURY, ON K6A 1K7

Ship To:

DART AEROSPACE
1270 ABERDEEN STREET
HAWKESBURY, ON K6A 1K7

Customer ID		Customer PO		Payment Terms	
DARA		PO17555		Net 30 Days	
Shop Order No.		Shipping Method		Ship Date	Due Date
73276		R & L CARRIER		8/16/12	9/15/12
Quantity	Item	Description		Unit Price	Extensi
1	EACH	OR AMS 2759-IC) SANDBLAST AFTER HT D350-748-241TRN HEAT TREAT TO MIN 180 KSI (MIL-T-6736		205.000	20
1	EACH	OR AMS 2759-IC) SANDBLAST AFTER HT D350-748-241TRN HEAT TREAT TO MIN 180 KSI (MIL-T-6736		205.000	20
1	EACH	OR AMS 2759-IC) SANDBLAST AFTER HT D350-748-241TRN HEAT TREAT TO MIN 180 KSI (MIL-T-6736		205.000	20
1	EACH	OR AMS 2759-IC) SANDBLAST AFTER HT D350-748-241TRN HEAT TREAT TO MIN 180 KSI (MIL-T-6736		205.000	20
		250 POUNDS TOTAL			

ANY DISCREPANCIES MUST BE REPORTED WITHIN 10 DAYS AFTER RECEIPT.

We accept AMEX, Visa & Master Card



Heat Treating and Metallurgical Consulting

Subtotal	2,05
Shipping/Handling	
Total Invoice Amount	2,05
Payment Received	
TOTAL	2,05

Visit our Web Site: <www.thomasregister.com/metlab/>

North American Free Trade Agreement Certificate of Origin

Please print or type

1. Exporter's Name and Address: Metlab 1000 E. Mermaid Lane Wyndmoor, PA 19038 <div style="border: 1px solid black; padding: 2px;">Tax Identification Number: 23-2973306</div>		2. Blanket Period: (dd/mm/yyyy) <div style="display: flex; justify-content: space-between;"> From: 01/01/2012 To: 31/12/2012 </div>								
3. Producer's Name and Address: Metlab 1000 E. Mermaid Lane Wyndmoor, PA 19038 <div style="border: 1px solid black; padding: 2px;">Tax Identification Number: 23-2973306</div>		4. Importer's Name and Address: Dart Aerospace 1270 Aberdeen Street Hawkesbury, ON K6A 1K7 CANADA <div style="border: 1px solid black; padding: 2px;">Tax Identification Number:</div>								
5. <div style="text-align: center;">Description of Good(s)</div>	6.	HS Tariff Classification Number	7.	Preference Criterion	8.	Producer	9.	Net Cost	10.	Country of Origin
Heat Treatment Services		8483.401		C		Yes		No		USA
11. I CERTIFY THAT: <ul style="list-style-type: none"> * the information on this document is true and accurate and I assume the responsibility for proving such representations. I understand that I am liable for any false statements or material omissions made on or in connection with this document; * I agree to maintain, and present upon request, documentation necessary to support this Certificate, and to inform, in writing, all persons to whom the Certificate was given of any changes that would affect the accuracy or validity of this Certificate; * the goods originated in the territory of one or more of the Parties, and comply with the origin requirements specified for those goods in the North American Free Trade Agreement, and unless specifically exempted in Article 411 or Annex 401, there has been no further production or any other operation outside the territories of the Parties; and * this Certificate consists of <u>One (1)</u> page, including all attachments. 										
Authorized Signature: <div style="text-align: center; font-size: 2em;">MP</div>						Company: Metlab				
Name: Mark Podob						Title: Vice President				
Date: (mm/dd/yyyy) 8/16/2012			Telephone: 215-233-2600			Fax: 215-233-5653				



Commercial Invoice:145

Ship From: Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Canada
Tel # 1.613.632.5200
GST # RT101272607

Ship To: METLAB
1000 E Mermaid LN
Wyndmoor
PA, 19038 US

ATTN: Mark Podob
PH# 215 233 2600

Date: 27-Jul-12 **P.O. # 17555**

Ship Via: Day & Ross PPD **FOB:Origin**

Item	Part Number / Product Description	Tariff Class.	Quantity	Unit Price	Total
1	Crosstube D350-748-241	8803.20	10	\$ 1,250.00	\$ 12,500.00
2					
3					
4					

All Prices are in US Dollars

All of the above parts were made in Canada unless otherwise indicated
THIS IS A CUSTOMS INVOICE ONLY

Sub Total \$12,500.00

Total \$12,500.00

Amount Due: \$12,500.00

Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Canada
Tel.: 1.613.632.5200
Fax: 1.613.632.1185
GST # RT101272607



1000 E. Mermaid Ln., Wyndmoor (Phila.) PA 19038-8093
Tel. (215) 233-2600 Fax (215) 233-5653

ORDER ACKNOWLEDGEMENT

E-MAILED TO: _____

FAXED TO: _____

613 632 1053

QF-4.7.2.2-01

Rev A. 5/10/10

CUSTOMER: <i>Dart</i>	PO NUMBER: <i>P017555</i>
DATE MATERIAL RECEIVED: <i>8/1/2012</i>	METLAB QUOTE NUMBER: <i>N/A</i> Or, MINIMUM STD ORDER(CHECK) _____
ESTIMATED SHIP DATE: <i>8/15/12</i>	METLAB S.O. NUMBER: <i>173277</i>

THANK YOU FOR YOUR ORDER. WE WILL MAKE OUR BEST EFFORT TO SHIP YOUR ORDER ON OR BEFORE THE ESTIMATED SHIP DATE SHOWN ABOVE. IF YOU NEED TO CONTACT US REGARDING THIS ORDER, PLEASE REFERENCE THE METLAB S.O. NUMBER SHOWN ABOVE.

QUOTATION MISSING? ☒ OK TO PROCESS WITHOUT *DM*

PURCHASE ORDER MISSING? _____ OK TO START PROCESSING WITHOUT _____

NOTE THAT WE NEED THE FOLLOWING INFORMATION IN ORDER TO COMPLETE YOUR ORDER AND TO MEET THE PROMISED SHIP DATE:

TECHNICAL INFORMATION REQUIRED(LIST) : _____ ON HOLD : YES _____ NO _____

OTHER INFORMATION OR CLARIFICATION: _____ ON HOLD : YES _____ NO _____

RELEASED FOR PROCESSING BY: *DM* DATE: *8/8/12*

ACKNOWLEDGED BY: _____

TODAY'S DATE: _____

SHIPPED DATE: _____

THIS ORDER IS ACKNOWLEDGED WITH THE UNDERSTANDING THAT THE ABOVE PURCHASE ORDER IS IN ACCORDANCE WITH METLAB'S TERMS AND CONDITIONS OF SALE AS SUBMITTED AT THE TIME OF THE ABOVE QUOTATION.



STRAIGHT BILL OF LADING - 1.866.DAY.ROSS

OTT-1983132.0



NIR R-500048-5.

BILLER INIT. INITIALES PROPRIETAIRES A LA FACTURATION	OFF UNIT DÉCHARGÉ DU VÉHICULE NO.	NO. OF PIECES * QUANTITÉ DE MORCEAUX
	ON UNIT CHARGÉ DANS VÉHICULE NO.	NO. OF PIECES QUANTITÉ DE MORCEAUX

DATE MONTH DAY YEAR 07 27 12	LEVEL OF SERVICE <input type="checkbox"/> GENERAL	C.O.D. AMOUNT CURRENCY: <input type="checkbox"/> CDN <input type="checkbox"/> U.S.	Pick Up Information Telephone Number: Contact Name: Ready Date & Time: Closing Time:
<input type="checkbox"/> PRIVATE RESIDENCE PICK UP <input type="checkbox"/> PRIVATE RESIDENCE DELIVERY <input type="checkbox"/> PALLETS BEING RETURNED <input type="checkbox"/> HAZARDOUS GOODS* <input type="checkbox"/> APPOINTMENT DELIVERY (DATE/TIME)	<input type="checkbox"/> TAILGATE PICK UP <input type="checkbox"/> HEATED SERVICE <input type="checkbox"/> TRADE SHOW PU <input type="checkbox"/> INBOND	<input type="checkbox"/> TAILGATE DELIVERY <input type="checkbox"/> TEMPERATURE CONTROL (TL ONLY) <input type="checkbox"/> TRADE SHOW DELIVERY	
*this shipment contains dangerous goods as set out in the attached shipper's declaration			REQUESTED BY: <input type="checkbox"/> SHIPPER <input type="checkbox"/> CONSIGNEE <input type="checkbox"/> BILL TO <input type="checkbox"/> THIR

SHIPPER DAY & ROSS ACCT. NO. 038326 TEL NO. 6136325200 SHIPPER'S NAME PICK UP ADDRESS DART AEROSPACE 1270 Aberdeen ST HAWKESBURY ON N4A1K7 CITY PROV. COUNTRY POSTAL CODE	CONSIGNEE DAY & ROSS ACCT. NO. TEL NO. 215 233 CONSIGNEE'S NAME Mark Podob DELIVERY ADDRESS MetLab 1000 E. Mermaid Lane WYNDMOOR PA 1 CITY PROV. COUNTRY POSTAL CODE
---	--

METHOD OF PAYMENT <input checked="" type="checkbox"/> PREPAID <input type="checkbox"/> COLLECT <input type="checkbox"/> CASH IN ADVANCE AMOUNT CURRENCY: <input type="checkbox"/> CDN <input type="checkbox"/> THIRD PARTY BILL TO ACCOUNT NUMBER <input type="checkbox"/> VISA <input type="checkbox"/> M.C. <input type="checkbox"/> AMX EXPIRY DATE CARD NO.	OTHER BILL TO PARTICULARS BILL TO: BILL TO ADDRESS GST: CITY PROV. COUNTRY POSTAL CODE
--	--

SPOT QUOTE NO.	ROUTING OR SPECIAL INSTRUCTIONS	MAXIMUM LIABILITY OF \$2.00/LB OR \$4.41/KG COMPUTED ON THE TOTAL ACTUAL WEIGHT UNLESS DECLARED VALUATION STATES OTHERWISE. PLEASE SEE ADDITIONAL TERMS AND CONDITIONS ON REVERSE.		
NO. OF PCS.	DESCRIPTION OF ARTICLES AND SPECIAL MARKS	WEIGHT <input checked="" type="checkbox"/> LBS <input type="checkbox"/> KGS	DECLARED VALUE <input type="checkbox"/> CDN <input type="checkbox"/> U.S.	DIMENSIONS
5	cardboard cartons	250		126x13x7
ALL USED HOUSEHOLD GOODS AND PERSONAL EFFECTS SHIPPED AT SHIPPER'S RISK OF DAMAGE				

The uniform TERMS OF CARRIAGE apply to this BILL OF LADING. (See Term and Condition No. 1)

NOTICE OF CLAIM must be submitted in writing within sixty (60) days of delivery. (See Term and Condition No. 2)

The carrier's maximum liability is limited by the TERM CONDITIONS of the Bill of Lading. (See Term and Condition No. 5)

SHIPPER'S REF. NO.	PO 17555
SHIPPER'S SIGNATURE	Brigitte Alder
PRINT	BRIGITTE Alder

PICK-UP DATE	07-27-2012	NO. OF PCS.	
DAY & ROSS DRIVER	DENIS	PURCHASE ORDER	
POWER NO.	270604	TRAILER NO.	16

01/11 JAN 1275



Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Tel: 613 632 9577
Fax: 613 632 1053

PURCHASE ORDER

Purchase Order # PO17555

Purchase Order Date 7/27/2012

PO Print Date 7/27/2012

Page Number 1 of 3

Order From :

VU-MET001

METLAB
1000 E. MERMAID LANE
WYNDMOOR, PA 19038
USA

Contact Name
Vendor Phone 215-233-2600
Vendor Fax 215-233-5653
Vendor Account Nbr

Buyer Brigitte Golden
Requisition Nbr
Tax Resale Nbr 10127-2607
Terms Net 30
Currency USD
FOB Destination-Collect

Ship To : DART AEROSPACE LTD 1270 ABERDEEN
HAWKESBURY, ON K6A 1K7
CANADA

Line Nbr	Reference Revision ID Vendor Part Number	Description/ Mfg ID	Req Date/ Taxable	Req Qty/ Unit of Measure	Ship Method	Unit Price	Extended Price
1	84674	D350-748-241TRN	10:40:00 AM Yes	✓ 1.00	Day & Ross ppd	\$205.0000	\$205.0
		Special Inst: HEAT TREAT TO MIN 180 KSI (MIL-T-6736 OR AMS 2759-1C) SAND BALST TUBE AFTER HEAT TREAT CERTIFICATIONS					
2	84667	D350-748-241TRN	10:40:00 AM Yes	✓ 1.00	Day & Ross ppd	\$205.0000	\$205.0
		Special Inst: SAME AS ABOVE					
3	84670	D350-748-241TRN	10:40:00 AM Yes	✓ 1.00	Day & Ross ppd	\$205.0000	\$205.0
		Special Inst: SAME AS ABOVE					
4	84676	D350-748-241TRN	10:40:00 AM Yes	✓ 1.00	Day & Ross ppd	\$205.0000	\$205.0

PO Instructions: CROSSTUBE WILL BE LEAVING THIS AFTERNOON WITH DAY&ROSS TRACKING # OTT19831320 No substitution or deviation without consent.
Certificate of Conformity or Material Certification required - YES NO

Change Nbr: 1

Change Date: 7/27/2012



Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Tel: 613 632 9577
Fax: 613 632 1053

PURCHASE ORDER

Purchase Order ID **PO17555**

Purchase Order Date 7/27/2012

PO Print Date 7/27/2012

Page Number 2 of 3

Order From :

VU-MET001

METLAB
1000 E. MERMAID LANE
WYNDMOOR, PA 19038
USA

Contact Name		Buyer	Brigitte Golden
Vendor Phone	215-233-2600	Requisition Nbr	
Vendor Fax	215-233-5653	Tax Resale Nbr	10127-2607
Vendor Account Nbr		Terms	Net 30
		Currency	USD
		FOB	Destination-Collect

Special Inst: SAME AS ABOVE

5	84659	D350-748-141TRN	10:40:00 AM	1.00	Day & Ross ppd	\$205.0000	\$205.0
			Yes				

Special Inst: SAME AS ABOVE

6	86271	D350-748-141TRN	10:40:00 AM	1.00	Day & Ross ppd	\$205.0000	\$205.0
			Yes				

Special Inst: SAME AS ABOVE

7	84666	D350-748-241TRN	10:40:00 AM	1.00	Day & Ross ppd	\$205.0000	\$205.0
			Yes				

Special Inst: SAME AS ABOVE

8	84660	D350-748-141TRN	10:40:00 AM	1.00	Day & Ross ppd	\$205.0000	\$205.0
			Yes				

Special Inst: SAME AS ABOVE

9	84675	D350-748-241TRN	10:40:00 AM	1.00	Day & Ross ppd	\$205.0000	\$205.0
			Yes				

Special Inst: SAME AS ABOVE

10	86266	D350-748-141TRN	10:40:00 AM	1.00	Day & Ross ppd	\$205.0000	\$205.0
			Yes				

PO Instructions: CROSSTUBE WILL BE LEAVING THIS AFTERNOON WITH DAY&ROSS TRACKING # OTT19831320

No substitution or deviation without consent.
Certificate of Conformity or Material Certification required - YES NO

Change Nbr: 1

Change Date: 7/27/2012



Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Tel: 613 632 9577
Fax: 613 632 1053

PURCHASE ORDER

Purchase Order ID **PO17555**

Purchase Order Date 7/27/2012

PO Print Date 7/27/2012

Page Number 3 of 3

Order From :

VU-MET001

METLAB
1000 E. MERMAID LANE
WYNDMOOR, PA 19038
USA

Contact Name		Buyer	Brigitte Golden
Vendor Phone	215-233-2600	Requisition Nbr	
Vendor Fax	215-233-5653	Tax Resale Nbr	10127-2607
Vendor Account Nbr		Terms	Net 30
		Currency	USD
		FOB	Destination-Collect

Special Inst: SAME AS ABOVE

PO Total: \$2,050.0

PO Instructions: CROSSTUBE WILL BE LEAVING THIS AFTERNOON WITH DAY&ROSS TRACKING #
OTT19831320

No substitution or deviation without
consent.

Certificate of Conformity or Material
Certification required - YES NO

Change Nbr: 1

Change Date: 7/27/2012

Brigitte Golden

From: Mark Podob <mpodob@metlabheattreat.com>
Sent: Friday, July 27, 2012 11:21 AM
To: Dan Krackovic; Doris Funches; Eugene Roberts
Cc: Brigitte Golden
Subject: FW: PO17555 from Dart
Attachments: PO17555 METLAB.pdf

New P.O. from Dart Aerospace attached.
Thanks.

Mark Podob
Vice President, Marketing and Sales
Metlab
1000 E. Mermaid Lane
Wyndmoor, PA 19038
215-233-2600 Ext. 232
(F) 215-233-5653
mpodob@metlabheattreat.com

This message and any attachments are intended for the individual or entity named above. If you are not the intended recipient, please do not forward, copy, print, use or disclose this communication to others; also please notify the sender replying to this message and then delete it from your system.

From: Brigitte Golden [<mailto:bgolden@dartaero.com>]
Sent: Friday, July 27, 2012 11:19 AM
To: Mark Podob
Cc: 'Linda Lacelle'
Subject: PO17555 from Dart

Please find attached the PO
Thank You

From: Linda Lacelle [<mailto:llacelle@dartaero.com>]
Sent: Thursday, July 26, 2012 2:36 PM
To: mpodob@metlabheattreat.com
Cc: Brigitte Golden
Subject: more tubes

Hi Mark,

We will be shipping out 9 tubes tomorrow for heat treat. Another batch should follow end of next week. As always, I need these asap..

Thx!

Linda Lacelle
Production manager
Dart Aerospace

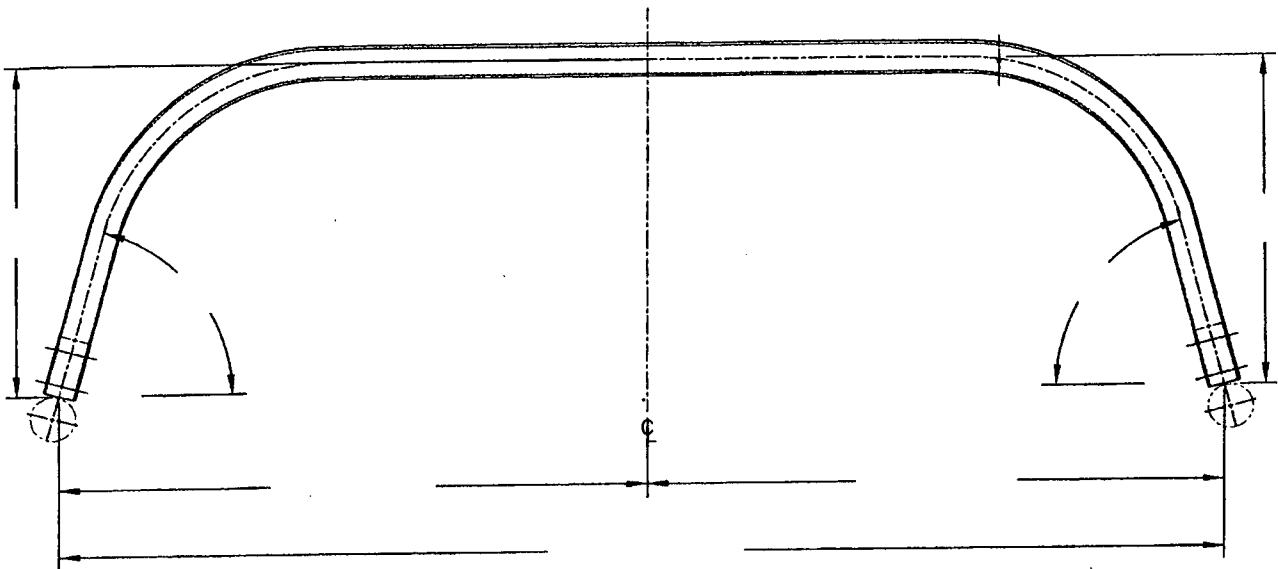
D 350 X-TUBE CUFF MEASURMENTS AFTER HEAT TREATING

	TYPE	BATCH #	SIDE A TWO READINGS	SIDE B TWO READINGS
1	AFT	84672	2.251"/2.235"	2.257"/2.244"
2	AFT	84677	2.239"/2.245"	2.239"/2.251"
3	AFT	84669	2.238"/2.244"	2.232"/2.255"
4	AFT	84668	2.254"/2.238"	2.256"/2.240"
5	AFT	84675	2.248"/2.238"	2.251"/2.240"
6	AFT			
7	AFT			
8	AFT			
9	AFT			
10	AFT			
11				
12	FWD	84660	2.257"/2.233"	2.253"/2.228"
13	FWD			
14	FWD			
15	FWD			
16	FWD			
17	FWD			
18	FWD			
19	FWD			
20	FWD			
21	FWD			
22	FWD			
23	FWD			

DART AEROSPACE LTD		Work Order: 84666
Description: Crosstube High Aft (AS350/355)		Part Number: D350-748-201
Inspection Dwg: D350-748-241	Rev: F	Page 1 of 1

** AFTER stress Relif. **

Required Dimension	Min	Max
Height	31.22	31.48
1/2 Span	40.77	41.03
Angle	75	77
Total Span	81.54	82.06
Bending Passes	7	--
Crushing	--	6%
Twist	--	0.25



	Side A	Side B
Bending Passes		
Crushing		
Comments		

QC15 Inspection	
Date	

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	10.08.23	Dwg Rev updated	KJ	
C	12.04.16	Added bending, crushing & twist dimensions	KJ	
D	12.07.31	Dwg Rev updated	KJ	